

1 1. A method for optimizing response time of physical devices  
2 in a data storage system comprising:

3 collecting statistics for each of the physical devices;  
4 determining from the statistics the *n* most active of the  
5 physical devices;

6 for each of the *n* most active of the physical devices,  
7 adjusting a mirror service policy associated with one or more  
8 mirrored logical volumes serviced by the physical device to  
9 reduce seek time.

1 2. The method of claim 1, wherein the statistics include  
2 utilization and wherein adjusting is performed if the  
3 utilization of the physical device is greater than a threshold  
4 value.

1 3. The method of claim 1, wherein adjusting comprises:  
2 using a cost function analysis to determine that workload  
3 assigned to the one or more selected mirrored logical volumes  
4 according to a current mirror service policy can be re-assigned  
5 to a corresponding mirrored copy according to a new mirror  
6 service policy, the cost function analysis indicative of seek  
7 time and involving the selected physical device and any physical  
8 device on which a mirrored copy resides.

1 4. The method of claim 3, wherein the physical devices  
2 involved in the cost function analysis are physical mirrors.

1 5. The method of claim 3, wherein using comprises:  
2 computing cost functions for each of the physical devices  
3 involved in the cost function analysis and determining a maximum  
4 value from the computed cost functions, based on the current  
5 mirror service policy and the new mirror service policy.

1 6. The method of claim 5, wherein using comprises:  
2 determining that the reassignment of workload can be made  
3 if the maximum value based on the new mirror service policy is  
4 less than the maximum value based on the current policy.

1 7. The method of claim 6, wherein adjusting comprises  
2 processing the one or more logical volumes in a sequence  
3 beginning with the outermost logical volume bordering logical  
4 volumes serviced by another physical device.

1 8. The method of claim 7, wherein, for each successive one  
2 of the processed logical volumes, the new mirror service policy  
3 of an immediate predecessor of the processed logical volumes is  
4 used as the current mirror service policy for the cost function  
5 analysis.

1 9. The method of claim 2, wherein the threshold value  
2 comprises fifty percent.

1 10. A computer program product residing on a computer  
2 readable medium for optimizing response time of physical devices  
3 in a data storage system, comprising instructions for causing a  
4 computer to:  
5 collect statistics for each of the physical devices;

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6         determine from the statistics the  $n$  most active of the
7 physical devices;
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8       for each of the  $n$  most active of the physical devices,
9       adjust a mirror service policy associated with a mirrored
10      logical volume serviced by the physical device to reduce seek
11      time.

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1 11. A data storage system comprising:

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2      physical devices having mirror logical volumes stored
3  thereon;
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4           a storage controller for controlling access to the  
5   physical devices; and

6            wherein the storage controller collects for the physical  
7 devices statistics including utilization and, for each of  $n$  of  
8 the most active of the physical devices, adjusts mirror service  
9 policy associated with a mirrored logical volume serviced by the  
10 physical device to minimize seek time when the utilization is  
11 greater than a threshold value.